

REMARKS

Claims 1-43 were examined and reported in the Office Action. Claims 1-43 are rejected. Claims 3-11, 13-21, 24-32, and 34-43 are canceled. Claims 1, 12, 22 and 33 are amended. New claims 44-51 are added. Claims 1-2, 12, 22-23, 33, and 44-51 remain.

Applicant requests reconsideration of the application in view of the following remarks.

I. 35 U.S.C. § 102(e)

It is asserted in the Office Action that claims 1-7, 10, 12-17, 20, 22-28, 31, 33-38, and 41 are rejected under 35 U.S.C. § 102(e), as being anticipated by U. S. Patent No. 6,330,345 issued to Russo et al. ("Russo"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.' (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). 'The identical invention must be shown in as complete detail as is contained in the ... claim.' (Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, *i.e.*, identity of terminology is not required. (In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990))."

Applicant's amended claim 1 contains the limitations of "[a]n image capturing apparatus comprising: an image capturing section..., said image capturing section comprises: a detection element (11a) for converting the shape of the object into an analog signal; and an A/D conversion circuit (14) for converting the analog signal output from said detection element into a digital signal in accordance with the parameter value set in said parameter setting section and outputting the signal as the image data, and the parameter value set in said parameter setting section includes a

conversion range and conversion resolution in converting the analog signal into the digital signal; and a capture control section (3a) ..., wherein the evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value. "

Applicant's amended claim 12 contains the limitations of "[a]n image capturing method comprising: converting a shape of an object into an electrical quantity in accordance with a preset parameter value to generate image data representing an image corresponding to the shape of the object; calculating an evaluation index for evaluating image quality of the image from the image data; and changing the parameter value to make the evaluation index fall within a range of a preset reference value, the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the shape of the object is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a histogram index generated from a histogram representing a density of the image, and the histogram index is a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value."

Applicant's amended claim 22 contains the limitations of "[a] fingerprint collation apparatus comprising: an image capturing section..., said image capturing section comprises: a detection element ...; and an A/D conversion circuit ...;

a capture control section (3a) for receiving the image data output from said image capturing section, calculating an evaluation index for evaluating image quality of the fingerprint ridge/valley pattern image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set

in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value; and collation means for comparing and collating image data output from said capture control section with registered image data prepared in advance, wherein the evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value."

Applicant's amended claim 33 contains the limitations of "[a] fingerprint collation method comprising: converting a fingerprint ridge/valley pattern into an electrical quantity in accordance with a preset parameter value to generate image data representing a fingerprint image corresponding to the fingerprint ridge/valley pattern; calculating an evaluation index for evaluating image quality of the image from the image data; changing the parameter value to make the evaluation index fall within a range of a preset reference value; and comparing and collating the image data whose evaluation index falls within the range of the reference value with registered image data prepared in advance, wherein the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the fingerprint ridge/valley pattern is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a histogram index generated from a histogram representing a density of the image, and the histogram index is a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value."

In other words Applicant's claimed invention asserts apparatus and methods for capturing a fingerprint image. The image quality of the obtained fingerprint image is evaluated by an evaluation index, including a calculation method using a histogram ("calculating an evaluation index for evaluating image quality of the image from the image data, and if the evaluation index falls outside a range of a preset reference value, changing the parameter value set in said parameter setting section so as to make the evaluation index fall within the range of the reference value to output image data which is received from said image capturing section and the evaluation index of which falls within the range of the reference value, wherein the evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value" and for calculating the number of ridges ("the evaluation index calculated by said capture control section is a ridge count index generated on the basis of the number of ridges in the image, and said capture control section obtains an average ridge count in the horizontal direction which is an average ridge count per unit length of the image in the horizontal direction and an average ridge count in the vertical direction which is an average ridge count per unit length of the image in the vertical direction, and calculates a larger one of the average ridge count in the horizontal direction and the average ridge count in the vertical direction as the ridge count index." The parameters (conversion range and resolution) of the A/D conversion set in Applicant's fingerprint sensor chip is changed until a desired image quality is obtained. This results in obtaining a good fingerprint image.

Russo discloses an image control method of a fingerprint sensor. Russo further discloses a method of adjusting the sensitivity of the sensor array by evaluating the image quality of a fingerprint image by using a histogram. Distinguishable, Applicant's claimed invention changes the conversion range and resolution of A/D conversion using the evaluation index of an image's quality. Further, according to Russo the

control signals are fed back into the sensor array (see Russo, Figure 2) instead of the A/D conversion to adjust the gain (amplification factor) as the sensitivity of the sensor array. Timing is adjusted for the voltage samplings of the sensor elements and the amount of current (see Russo, column 5, lines 23-28).

Moreover, Russo discloses to only use the histogram of the gray level of an image as the image evaluation (see Russo, column 7, lines 44-51). And, Russo does not teach, disclose or suggest using an evaluation index as claimed by Applicant. Additionally, the reason given in the Office Action for rejecting claim 31 relates to a method for judging a failure by finding the pixel having the maximum or the minimum brightness (see Russo, column 6, lines 32-51), which is completely distinguishable from the calculation method for the image evaluation using the maximum value and the minimum value of amended claim 22. That is, Russo does not teach, disclose or suggest "evaluation index calculated by said capture control section is a histogram index generated from a histogram representing a density of the image, and said capture control section calculates, as the histogram index, a ratio between a maximum value on a side of the histogram where a density of the image is high and a minimum value immediately near the maximum value on a side where the density of the image is lower than the density representing the maximum value."

Therefore, since Russo does not disclose, teach or suggest all of Applicant's amended claims 1, 12, 22 and 33 respective limitations, Applicant respectfully asserts that a *prima facie* rejection under 35 U.S.C. § 102(e) has not been adequately set forth relative to Russo. Thus, Applicant's amended claims 1, 12, 22 and 33 are not anticipated by Russo. Additionally, the claims that directly or indirectly depend on claims 1 and 22, namely claims 2, and 23 and 50, respectively, are also not anticipated by Russo for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 102(e) rejections for claims 1-7, 10, 12-17, 20, 22-28, 31, 33-38, and 41 are respectfully requested.

II. 35 U.S.C. § 103(a)

A. It is asserted in the Office Action that claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Russo. Applicant has canceled claim 43. Therefore, the 35 U.S.C. 103(a) rejection of claim 43 is moot.

B. It is asserted in the Office Action that claims 8-9, 11, 18-19, 21, 29-30, 32, 39-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russo et al in view of U. S. Patent No. 5,659,626 issued to Ort et al ("Ort"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." "*All words in a claim must be considered in judging the patentability of that claim against the prior art.*" (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant has addressed Russo regarding claims 1, 12, 22 and 33 above in section I, for which the above-mentioned rejected claims depend on.

Ort discloses a fingerprint image processing method relating to fingerprint authentication, and a method for evaluating the image quality of the fingerprint in the direction and frequency of the ridge. Ort further discloses a method for obtaining the ridge direction and ridge frequency as an evaluation index, and also for making the

calculation using two-dimensional Fourier Transforms in (see Ort, column 15, lines 41-49). Further, although Ort discloses a direct estimation method, which does not use the Fourier Transforms (see Ort, column 15, lines 50-59), it is completely different from "the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the shape of the object is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a ridge count index generated on the basis of the number of ridges in the image, and the ridge count index is a larger one of an average ridge count per unit length of the image in the horizontal direction and an average ridge count per unit length of the image in the vertical direction."

It should be noted that the Office Action asserts that in Table 4 of Ort (see also, Ort, column 41, lines 1-40) the number of ridges is obtained in the horizontal and vertical directions. However, XPOS and YPOS in Table 4 are the positions in the horizontal and vertical directions of minutia (the characteristic points of the fingerprint image), as described in Ort at column 31, lines 27-28. This is completely different from Applicant's calculation method of "the parameter value includes a conversion range and conversion resolution in converting an analog signal into a digital signal, the shape of the object is converted into an analog signal, the analog signal is converted into a digital signal in accordance with the parameter value and output as the image data, the evaluation index is a ridge count index generated on the basis of the number of ridges in the image, and the ridge count index is a larger one of an average ridge count per unit length of the image in the horizontal direction and an average ridge count per unit length of the image in the vertical direction."

Therefore, even if Russo were combined with Ort, the resulting invention would still not include all of Applicant's claimed limitations. And, therefore, there would be no motivation to combine Russo with Ort. Moreover, by viewing the disclosures of Russo and Ort, one can not jump to the conclusion of obviousness without impermissible hindsight. According to MPEP 2142, [t]o reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn

by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention 'as a whole' would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the 'differences,' conduct the search and evaluate the 'subject matter as a whole' of the invention. The tendency to resort to 'hindsight' based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art."

Neither Russo, Ort, nor the combination of the two, teach, disclose or suggest the limitations contained in Applicant's amended claims 1, 12, 22, and 33, as listed above. Since neither Russo, Ort, nor the combination of the two, teach, disclose or suggest all the limitations of Applicant's amended claims 1, 12, 22 and 33, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claims 1, 12, 22 and 33 are not obvious over Russo in view of Ort since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, Applicant notes that claims 8-9, 11, 18-19, 21, 29-30, 32, 39-40 and 42 are canceled. And, claims 8 and 11 limitations are included in new claim 44, which is based on claim 1; claims 18 and 21 limitations are included in new claim 46, which is based on claim 12; claims 39 and 42 limitations are included in new claim 51, which is based on claim 33. Therefore, new claims 44, 46, 51, and each of their respective dependent claims, are also not obvious over Russo in view of Ort for the same reasons.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 8-9, 11, 18-19, 21, 29-30, 32, 39-40 and 42 are respectfully requested.

CONCLUSION

In view of the foregoing, it is submitted that claims 1-2, 12, 22-23, 33, and 44-51 patentably define the subject invention over the cited references of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes a telephone conference would be useful in moving the case forward, he is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: February 1, 2005

By: 

Steven Laut, Reg. No. 47,736

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(310) 207-3800

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on February 1, 2005.


Jean Svoboda